USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: A Problem- Solving Tool for Mitigating the Impact on Water Quality of Management Practices in Small Rural Watersheds.

Duration: September 1, 1997 to August 31, 2000

Federal funds requested: $195,107

Non Federal (matching) funds pledged: $390,548

Principal investigators:

Claudio Stockle and Shulin Chen (Washington State University), Jan Boll and Behzad lzadi (University of Idaho). Co-Principal Investigators: Ron Hermanson (Washington State University) Keith Saxton and Don McCool (USDA/ARS, Pullman, WA), Larry King (Washington State University), Tom Hess (University of Idaho), Myron Molnau (University of Idaho). Cooperators.-Gerald Flerchinger (Northwest Watershed Research Center, USDA-ARS, Boise, ID), Jeff Arnold (Blackland Research Center, Texas A&M University, Temple, Texas), Reza Savabi (Purdue University).

Congressional district: Fifth (Washington) and First (Idaho)

Statement of critical regional or state water problems:

Agriculture has been identified as a significant source of pollution to surface and groundwater (Tim and Jolly, 1994). In the US, the nationwide contribution of agricultural land to nonpoint source pollutants has been estimated at 64% of total suspended sediment and 76% of total phosphorus (Duda and Johnson, 1985). In Washington State, 666 lakes, river stretches or sections of coastal waters need additional protection or stricter pollution controls to restore water quality (Washington State Department of Ecology, 1996). A similar situation exists for 762 stream segments in Idaho, where close monitoring is applied and water quality management plans must be in place in a 5-year time period. The primary source of pollution is ranoff and leaching from homes and farms which carries sewage, fertilizers, pesticides, and other chemicals, resulting in deteriorated surface water quality and nitrates and pesticides problems in groundwater (Spalding and Exner, 1993; Koterba et al., 1993).

Nature, scope, and objectives of the research:

One of the most productive approaches for watershed water quality improvement is to act at the local level defined by hydrologic units (i.e. a hydrologically-independent, small piece of landscape) at relatively low levels of integration (i.e., small watersheds). In this approach, the number of landowners and water quality issues involved is limited and possible corrective solutions are more manageable than when evaluating large basins as a

whole. Evaluating water quality changes in smaller watersheds also means that changes in watersheds within a larger basin can be compared and analyzed. The tool developed in this proposal will be applicable to the Pacific Northwest (PNW) where rainfall and snowmelt, often on frozen soil, dominate ranoff and sediment production. We expect, however, that with modification the framework of our approach also will be applicable to small agricultural watersheds elsewhere.

The objectives of this research are: a) to develop a computer-based problem-solving tool for analyzing the impact on water quality of management practices (point and nonpoint sources) in small rural watersheds, with special consideration of winter hydrology characteristics in the PNW, and b) to apply the tool to the Missouri Flat Creek watershed as a case study and use existing data sets for validation.